Information Desk

What's the Difference?

Holotype - Paratype - Syntype - Hypotype

BY

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In the 200 years that have passed since the first species of plants and animals were described by Linnaeus, a great many designations for type material have been invented. Some of these refer to what may be classed as "primary" types while others are concerned with "secondary" types.

Primary type material would include all the specimens which were used by the original author in preparing his original description. Secondary type material, on the other hand, would encompass those specimens which were used by other authors—and, of course, possibly even by the original author at a subsequent date—to either amplify or emend the original description, or to replace the original type specimen(s) if lost or destroyed. To the first group should be counted the holotype, the paratype(s), the syntype(s), and, under certain circumstances, the hypotype(s), while the second includes the neotype(s), the lectotype(s), and others.

The holotype is defined as the single specimen taken as "THE TYPE" by the original author of a species or subspecies. The paratype is a specimen or one of several specimens which were used by the original author as the basis of a new species or subspecies, in addition to the holotype. A syntype is one of several specimens of equal rank used in the original description without, however, being singled out as "holotype"; the word "cotype" is, fundamentally, a synonym of syntype; it is no longer used. A hypotype, finally, is a described, listed or figured specimen whether or not it is included in the discussion of the new taxon.

Early authors were rather lax in their attitude toward type specimens. It was not an uncommon practice to replace the original type specimen with a better "type" specimen, when it became available. Also, it was a fairly frequent practice for a museum to exchange type material, retaining one or two specimens of a given species. Today, when we are aware of the many difficulties attendant upon inadequate documentation, there is no excuse for less than the utmost care in selecting and preserving type specimens. This is true even where a species may have been found to be invalid for one of several possible reasons. However, the discovery of the so-called sibling species has added further strength to the need for care. Sibling-species are morphologically identical with each other, or at least so nearly so that even fairly careful examination does not reveal the fact that they are different species; yet sibling-species are reproductively isolated in spite of the great similarity of the adult individuals. Often, too, sibling-species may occur in the same locality and it is not impossible that they might even occupy the same habitat. From this it becomes evident that the conscientious taxonomist must base his description of a new taxon upon a single specimen—the holotype. This specimen thus becomes actually the name-bearer. No matter what discoveries may be made at a later time, the holotype remains the ultimate authority regarding that particular species and its name. It is not impossible that even with great care exercised in the examination of the type population, a sibling species might be inadvertently drawn in and included in the description. Later students will have the task of separating out the specimens which belong to the one, the original species, and the specimens properly assigned to the sibling-species. If the original author did not select a "holotype", there would be uncertainty as to which is the original species and which is the sibling-species, which latter must, of course, be given a different name.

There seems to be a growing trend to include as part of the description of a new species as full an appraisal as possible of the variability in the original population. This is actually most desirable, although not always possible. All specimens from this particular population become paratypes, except for the one select specimen, the holotype. The paratypes, as pointed out above, may, however, include specimens of a different species. But this possibility is more or less implied by the very fact that these specimens are designated as paratypes. Sometimes it is possible for an author to include in his appraisal of the variability of the new species material other than the original group collected at the type locality. Many au-

thors call such specimens also paratypes. This is, to our way of thinking, unfortunate since it does not clearly distinguish between the non-holotype specimens from the type locality and the non-holotype specimens from other places. Since it is possible that paratypes encompass sibling-species—and we refer here to paratypes from the type locality—it is even more probable that specimens from other localities may include sibling-species. Therefore, it seems only fitting that such subordinate "paratypes" be clearly distinguished in the original description. The term "hypotype" seems to fit the requirements well. And there seems to be no ruling by the International Commission on Zoological Nomenclature against this use of the term which allows a clear separation of specimens with different probabilities of uncertainty as to proper identity. If there is nothing more to recommend this differentiation than the fact that it may be of assistance to future workers, we think it sufficient justification to use the term "hypotype" in this sense. The definition of the paratype would then necessarily include the specification that it must come from the type locality while the hypotype does not.

Books, Periodicals, Pamphlets

THE GIANT AFRICAN SNAIL— A PROBLEM IN ECONOMIC MALACOLOGY

by Albert R. Mead
Professor of Zoology
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University of Chicago Press. 257 pp., 15 photographic illustr. November 28, 1961. $7.50.

This book is unique. It is the only one of any scope dealing with the growing economic problems caused by land snails in general, and by the Giant African Snail in particular. There are good and timely reasons for such a reference work, which is the first in any language assembling knowledge of the economic effect of land mollusks, both snails and slugs. For this field of biological study, the author uses the term "Economic Malacology".

The Giant African Snail is a growing menace to be reckoned with. This five to six inch monster, while not a champion for size among land snails, is an "exceedingly hardy, tenacious, variable and adaptable molluscan pest with a high reproductive potential and remarkably few natural enemies". Once started it is practically impossible to eradicate, and most man-devised methods for its control have not met with any signal success. The spread of this snail pest during World War II, including its build-up on the Hawaiian Islands, its fantastic ability to reproduce causing population explosions in the species, and its consequent depredations resulting from its omnivorous food habits all have served to create a "Giant African Snail Problem" of primary importance to the world.

Much has been written about the Giant African Snail in the world press and in scientific and agricultural journals. In recent years it has been the subject of considerable research and has led to the expenditure of much money to determine its present and potential economic danger and to develop successful means of control. Mead brings all of this scattered information together in organized form. This is a task for which he alone is preeminently qualified, having been personally associated with the Giant African Snail Problem for more than ten years. He has traveled many thousands of miles to gather firsthand data, has investigated the possible use of the snail as a food for people and animals, and is now studying a means of control by infecting it with a specific virus disease.

The book opens with a well-documented chapter on the present wide dispersal of the Giant African Snail, mainly by man, from its original home in East Africa. It continues with chapters on the factors favoring dispersal and survival, on its economic status as an agricultural pest, and on the various methods of control—chemical, mechanical, biological, legislative, and last, but by no means least, its control through human use as a possible food for poultry and livestock. There is an exceedingly interesting chapter on the phenomenon of decline following population explosion, the causes of which are not thoroughly understood and which could well be a subject for future intensive biological investigation leading, perhaps, to more effective control measures. The bibliography at the end of the book is a veritable gold mine of source information, covering over 40 pages, including 563 author listings and 881 separate titles.

Mead's work serves to bring into full focus the various attempts to control other snail and slug pests, with their successes and more frequent failures, together with the dangers inherent in approaching control problems without sound scientific research by qualified experts